

Figure 1

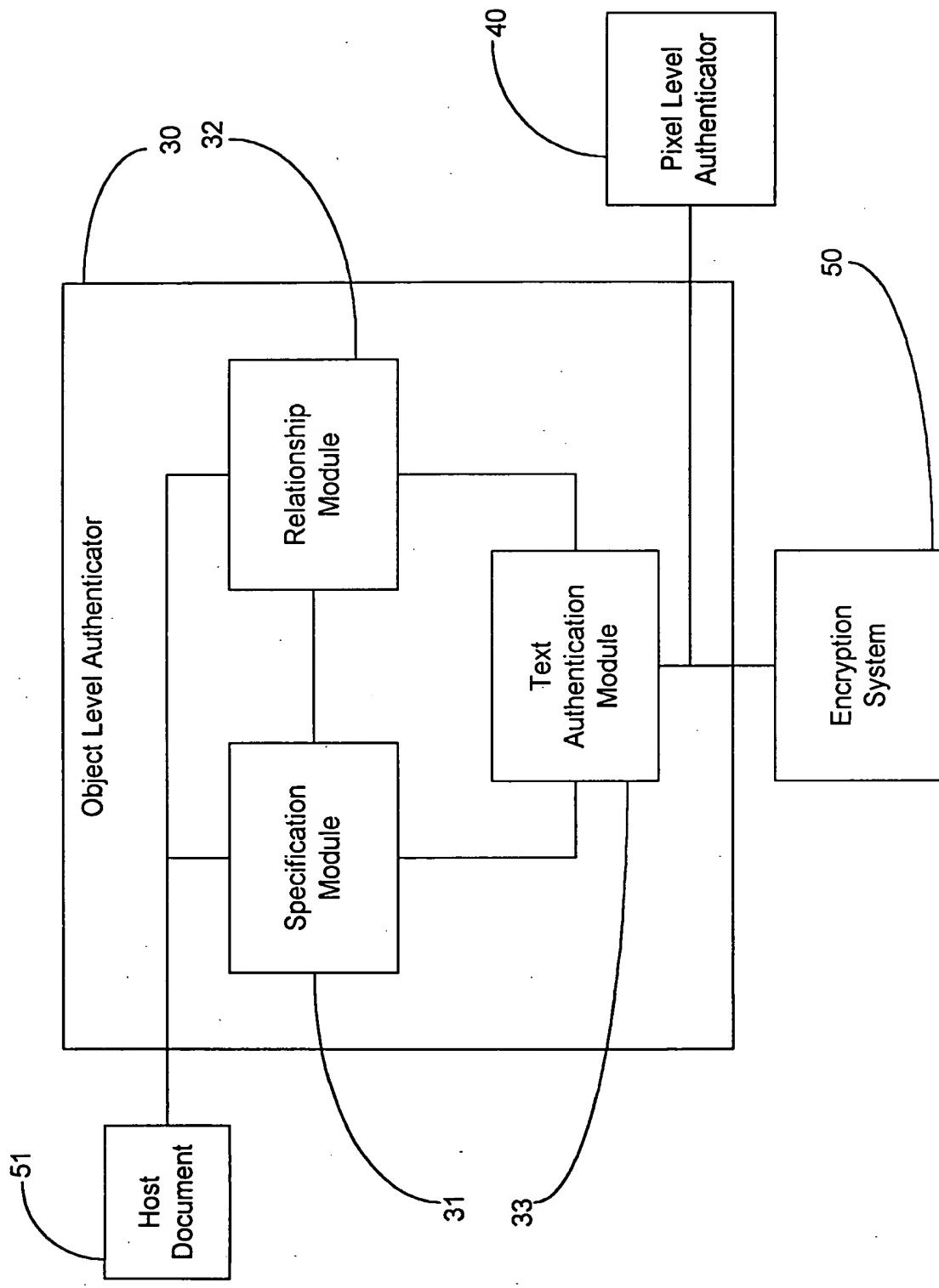
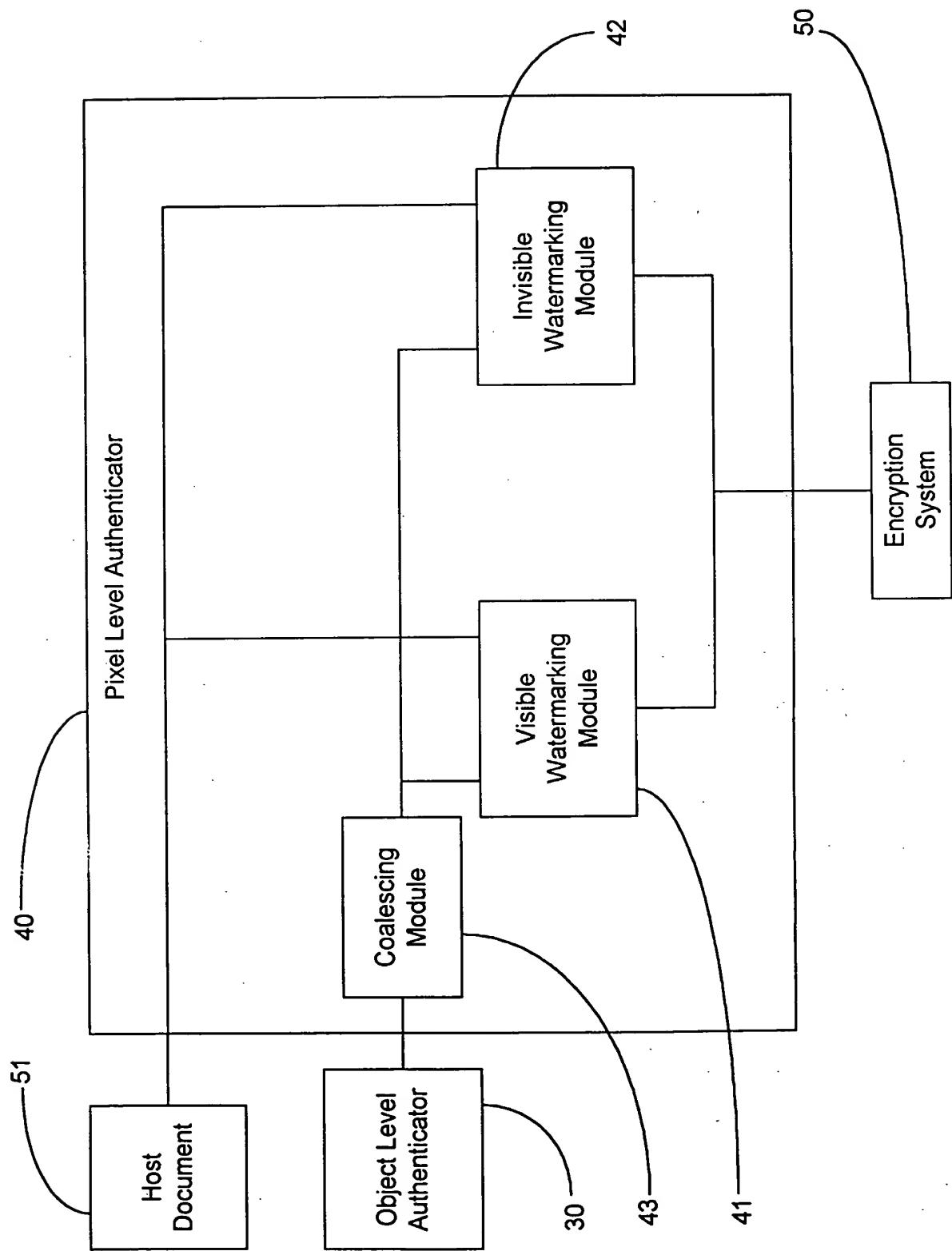


Figure 2

Figure 3



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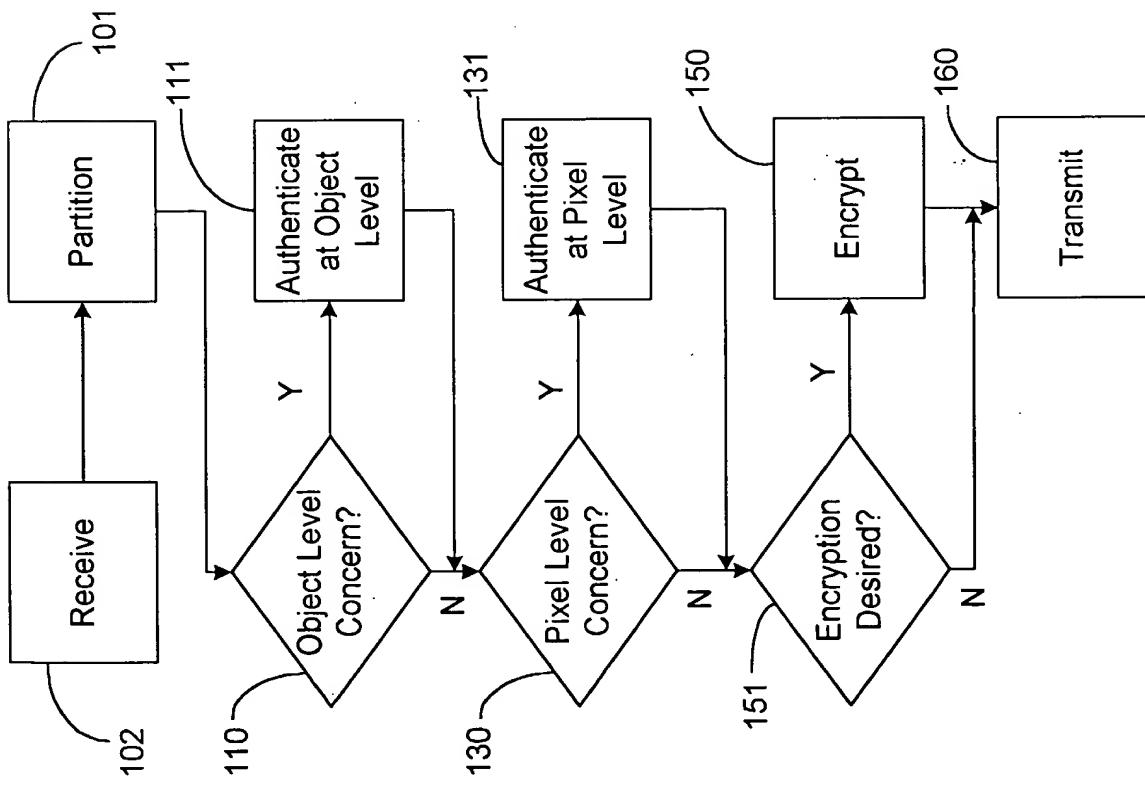


Figure 4

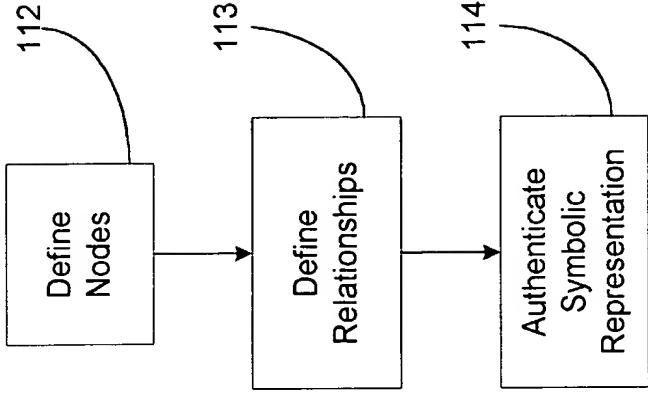


Figure 5

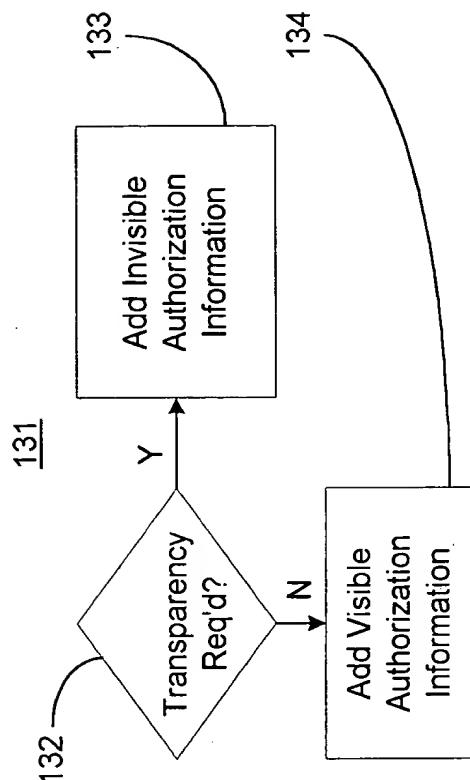
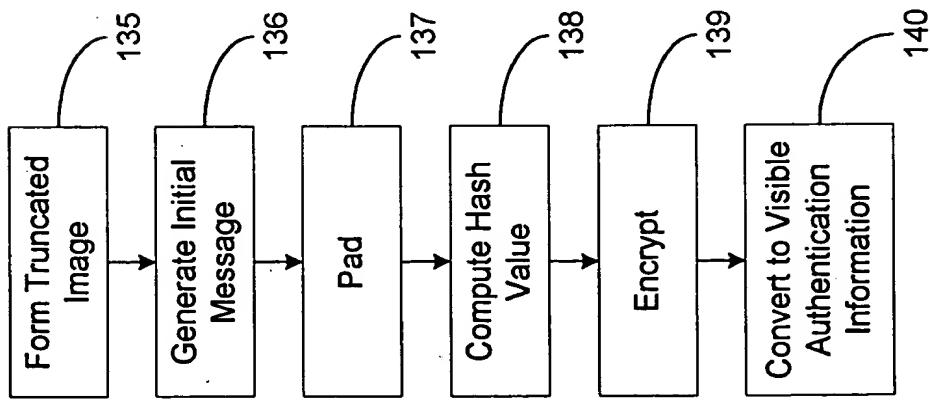


Figure 6

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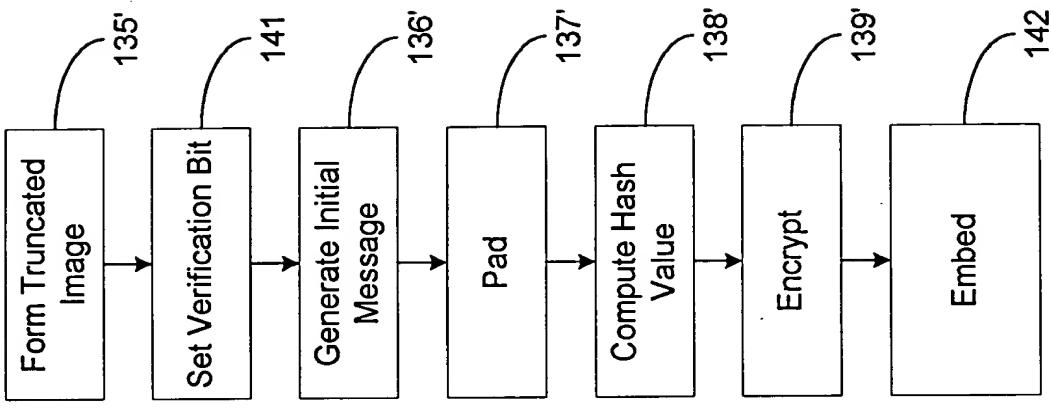


Figure 7

Figure 8

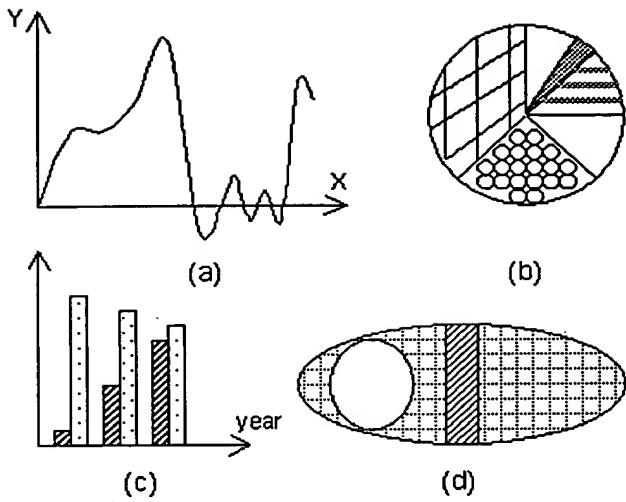
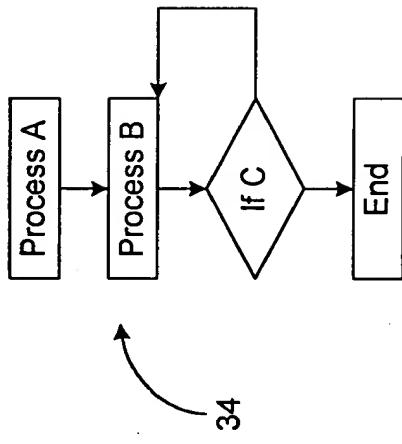


Figure 9

The system flow diagram is illustrated below. It shows the simplicity of the algorithm.



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Figure 10

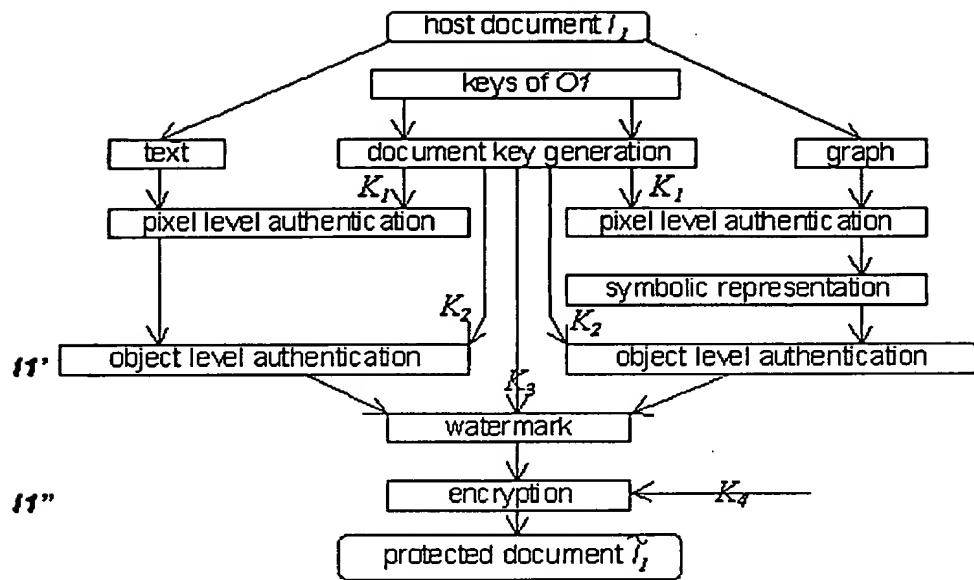


Figure 11

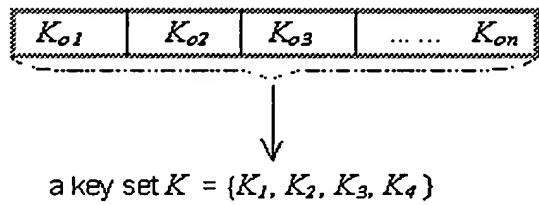


Figure 12

| Relationship symbols  |                  |
|-----------------------|------------------|
| <>                    | a tuple          |
| ∩                     | and              |
| ∪                     | or               |
| ≠                     | not              |
| →                     | parent→child     |
| ⇒                     | sibling relation |
| ↔                     | twin relation    |
| ↓                     | child←parent     |
| >                     | contain relation |
| —                     | condition        |
| .                     | .                |
| .                     | .                |
| .                     | .                |
| :                     | unconnected      |
| Specification symbols |                  |
| &                     | size             |
| #                     | shape            |
| @                     | position         |
| ©                     | color            |

Figure 13

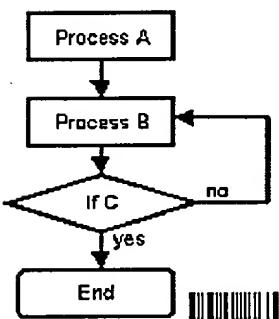


Figure 16

auth  
(a) Original size

auth  
(b) Enlarged

yes  
(c) Original size

(d) Enlarged

Figure 17

The system flow diagram is illustrated below. It shows the simplicity of the algorithm... "<N1{'Process A', #1, &reg, @mid}>N2{'Process B', #1, &reg, @mid}>N3{'If C', #3, &reg, @mid}>< N4{'End', #2, &reg, @mid}>yes; N2|no>"

Figure 14

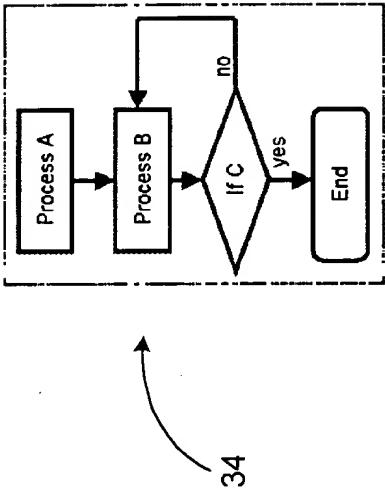


Figure 15

|                           | W/o content-dependent one way hash | Traditional serial length | Coalescing                            | Our algorithms, w/ content-dependent one way hash | Object level          | Duel level with coalescing |
|---------------------------|------------------------------------|---------------------------|---------------------------------------|---|-----------------------|----------------------------|
| (Text)                    |                                    |                           |                                       |   |                       |                            |
| Special coding            | Needed                             | Needed                    | May or may not needed                 | May or may not needed                             | May or may not needed | May or may not needed      |
| Inperceptibility          | Good                               | Good                      | OK                                    | Good  | Good                  | Good                       |
| Detectability             | Bad                                | Bad                       | OK                                    | Good  | Good                  | Good                       |
| Pixel-level detectability | Bad                                | Bad                       | Good if Method I<br>OK if Method II   | Can't detect                                      | OK                    | OK                         |
| Localization-ability      | Bad                                | Some bad. Some OK         | OK                                    | Good  | Good                  | Good                       |
| Copy and print            | Bad                                | Bad                       | Good if Method I,<br>bad if Method II | Good  | Good                  | Good                       |
| Noise resistance-ability  | Bad                                | OK                        | Good if Method I,<br>bad if Method II | Good  | Good                  | Good                       |
| Robustness to scaling     | Good                               | OK                        | OK if Method I,<br>bad if Method II   | Good  | Good                  | Good                       |

Figure 18